
2002 ESDIM Letter of Intent

1. Project Title: Reanalysis of the AOML archive of hurricane wind fields

2. Principle Investigator:

Dr. Mark D. Powell (PI) (Only 1 PI per project):

Organization: AOML Hurricane Research Division

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3. Other Investigators:

4. ESDIM Theme:

Data Continuity and Quality

5. NOAA Strategic Plan Element:

Advance Short-Term Warnings and Forecasts, Sustain Healthy Coasts

6. Is this project to be done in conjunction with any other project or program in your Line Office, other Line Office, other government agency, academic institution, or any other entity? If yes, describe project relationships.

The wind field archive is a resource that can be utilized by many other line offices and agencies. Specific agencies who already use this information or who have discussed using it include the Army Corps of Engineers (to evaluate projects for hurricane vulnerability) and FEMA (as possible scenario event information for the HAZUS model).

7. Project History:

Previous ESDIM Funding: Previous ESDIM support has assisted with purchasing database software for the HRD Realtime hurricane Surface wind analysis system. But not for this specific project.

Previous other funding:

8. Proposed funding from ESDIM:

By year: FY 2002; FY 2003; FY 2004

\$50 k, \$50 k, \$50 k

9. Proposed funding from other organizations:

Name of organization:

Total by year:

Total for duration of project:

10. Project Objective:

New techniques recently developed based on analysis of GPS sonde profile measurements in hurricanes necessitate a reanalysis effort to make the AOML/HRD wind field archive the most accurate available.

11. Brief Background and Description of Project:

HRD has developed a realtime hurricane wind analysis capability over the past few years. HRD scientists go on shift during hurricane episodes to create experimental wind field analyses to be used as guidance for forecasters at the National Hurricane Center. These analyses contain information on the peak winds and the radial extent of gale, 50 kt, and hurricane force winds as well as the central pressure and storm motion. Analysis images are placed on AOML's web site after a 24 h lag (to prevent confusion if products differ from NHC's advisories). Over 700 wind analyses have been conducted since 1993 comprising the most complete archive of hurricane wind field information in existence. These analyses are used by the insurance industry to evaluate risk models and deploy resources following a hurricane landfall. In addition, engineers make use of the information to assess whether design winds have been met for specific landfall events. Researchers are currently using the wind field information to evaluate remote sensing measurements in hurricanes (e.g. QuikScat and the airborne surface radar altimeter for waves) and to test initializing the GFDL hurricane prediction model as well as wave and storm surge models.

Based on new research conducted with GPS sonde measurements in hurricanes, HRD has developed new methods to estimate surface winds from 700 mb flight level reconnaissance observations. Our research suggests that surface winds estimated from 700 mb winds in the past may have been underestimated by 10-20 % in major (Category 3 or higher) hurricanes. Since wind pressure (and associated damage) increases with the square of the wind speed, a 10-20 % wind speed error can lead to much larger errors in damage estimated from such measurements. Additional enhancements made to the analysis system have resulted in more accurate analysis of the location and magnitude

of the maximum wind speed in the hurricane and the ability to download gridded wind field data to facilitate research use of the information. These improvements will be in place for the 2001 hurricane season but several hundred analyses are contained on our public web site that do not have the benefit of these improvements.

12. Primary Deliverables:

Revised wind field analysis images and gridded wind field data sets that will be available from our web site. The schedule of reanalysis will be as follows:

2002 Storms from 1998-2000

2003 Storms from 1995, 1996, 1997

2004 Major historical storms Hugo (1989), Andrew (1992), Donna (1960),

The 1935 Labor Day Storm, and storms from 1994.
